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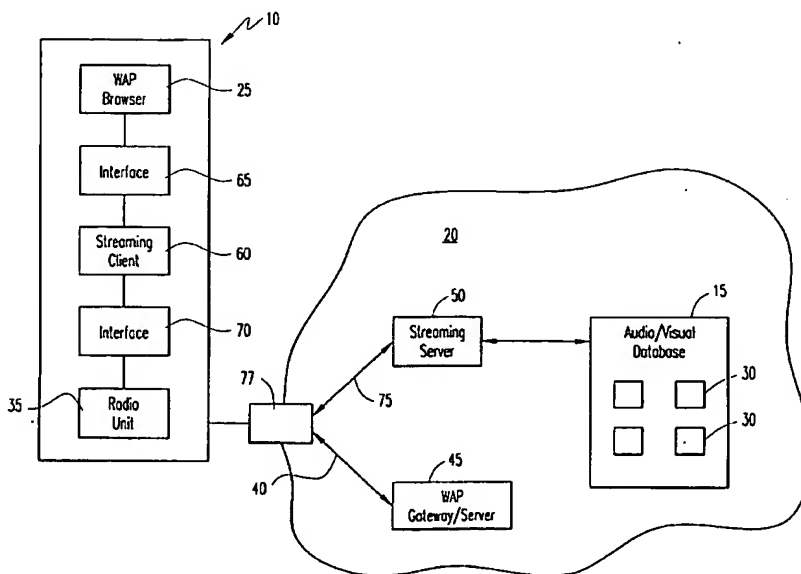
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: **METHOD AND APPARATUS FOR STREAMING SET-UP WITHIN A MOBILE TERMINAL**



(57) Abstract: A method for providing streaming data to a mobile terminal (10) wherein a WAP browser (25) enables selection of a streaming object (30) from a database (18) located within a network (20). A provided identifier enables the establishment of a radio channel by a WAP client (25) within a mobile terminal (10) to a server (45) associated with transmission of streaming data from the database (15) without going through the delays inherent in paging a mobile station (10) from a network (20).

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METHOD AND APPARATUS FOR STREAMING
SET-UP WITHIN A MOBILE TERMINAL

BACKGROUND OF THE INVENTION

5 Technical Field of the Invention

The present invention relates to streaming objects, and more particularly, to streaming objects within a mobile terminal, such as mobile telephone.

Description of Related Art

10 The expansion of the Internet and the increased bandwidth capabilities becoming available for accessing the Internet have increased the popularity of such features as streaming video and streaming audio. These features enable a user to download and execute video or audio files in a substantially real time fashion. The audio or video data is downloaded to a buffer within a user's personal computer, and the information within the buffer is used within an audio or video player such that the
15 audio and video data may be presented to the user substantially simultaneously as it is being downloaded from a website. This capability has increased the number of people which are surfing the web sites of record companies and other audio and video producers to listen to music or view videos. Streaming video and audio have largely been used for PC based systems to date, and the use of these features within mobile
20 terminal based systems have not been possible.

 Users have grown used to the relatively fast response times over the Internet using high bandwidth connections and fast performing PC's. These same users desire similar response times from mobile terminal based audio and video streaming capabilities even though high error prone radio channels will be utilized rather than
25 existing high bandwidth wireline connections. Thus, it will become necessary to minimize the time between the selection of an audio or video file for streaming play upon a mobile terminal. There is also a need to provide a mobile device capable of providing streaming capabilities that can travel virtually anywhere with the user and further to provide a device adaptable to any existing infrastructure.

30 The next generation of mobile terminal systems should provide the necessary functionality to utilize realtime streaming audio and video capabilities. Audio and

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video streaming will then be able to be transmitted over the radio interface to IP based streaming switches connected with the mobile terminal, or over circuit oriented radio connections to a circuit conversational switch associated with the mobile terminal.

5 SUMMARY OF THE INVENTION

The present invention overcomes the foregoing and other problems with a method and apparatus for providing streaming data to a mobile terminal. A WAP client within the mobile terminal enables selection of a streaming object from a database located within a network. An identifier is provided to the WAP client
10 responsive to the selected streaming object. In response to the provided identifier, a wireless connection is established from the mobile terminal to a server associated with the transmission of streaming data from the database.

BRIEF DESCRIPTION OF THE DRAWINGS

15 A more complete understanding of the method and apparatus of the present invention may be obtained by reference to the following Detailed Description when taken in conjunction with the accompanying Drawings wherein:

FIGURE 1 is a functional block diagram of a mobile terminal providing the audio and video streaming capabilities over a wireless network connection according
20 to the present invention; and

FIGURE 2 is a signaling diagram illustrating the interaction of the various components of a mobile terminal and a network according to the present invention.

DETAILED DESCRIPTION

25 Referring now to the drawings, and more particularly to FIGURE 1, there is illustrated a functional block diagram of a mobile terminal 10 configured to access an audio/video database 15 according to the method of the present invention. While the following description is primarily directed to streaming of audio and visual data, the invention may be used for streaming audio files, video files, 3-D complex graphics
30 files, measuring data, etc. in man-machine and machine-machine applications.

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A mobile terminal 10, which may comprise a mobile telephone, laptop computer, etc., can be contacted in one of two different manners. An external IP network 20 may contact the mobile terminal 10 via a PLMN network 77, or alternatively, the mobile terminal 10 may contact the external IP network 20 via the PLMN network 77. The establishment of a connection from a PLMN network 77 to the mobile terminal 10 requires a paging operation which can take up to ten seconds. In view of this required delay for the external IP network 20 to contact the mobile terminal 10, requests for access to audio/video objects 30 within the audio/video database 15 are better initiated from the mobile terminal 10.

The following discussions are with respect to use within a WAP environment, the invention may be used with any mobile client browser. A WAP client 25, consisting of a WAP browser located within the mobile terminal 10, enables a user of the mobile terminal 10 to select audio or video objects 30 as WAP selectable items from WAP gateway/server 45. In alternative embodiments, the mobile terminal 10 may be connected directly to an Internet application server, without the aid of a WAP gateway. This would provide better bandwidth and bearer quality. The objects are physically stored within an audio/video database 15. The WAP client 25 communicates with the audio/video database 15 via a radio unit 35 providing a wireless link 75 to the IP based streaming server 50 via a PLMN network 77. Once a selection of a streaming object has been made from a list of the streaming objects on the WAP gateway server 45 using wireless link 40 through the PLMN 77, the wireless links 75 are established through the PLMN network 77. The WAP gateway/server 45 may comprise separate components for the gateway and server functionalities or may be incorporated together.

The IP based streaming server 50 resides within the external IP network 20. The IP based streaming server 50 also enables a determination of the audio/video descriptions that are related with each object 30 within the audio/video database 15. The address/identity (an identifier) of selectable audio/video objects within the WAP gateway/server 45 may comprise an E-164 number to allow for the case where the mobile terminal 10 uses a circuit multimedia client such as 3GPP's 3G-324M. To allow for 3G-324M circuit video mobiles, the IP streaming server 50 would need, for

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example, a 2 Mbs (32 x 64) circuit trunk front board to interface to the circuit network. Alternatively, the address/identity of an object 30 may consist of an e-mail address or URL type address if an IP streaming client is used based on RTSP.

Once the WAP client 25 within the mobile terminal 10 determines that it has received an address/identity of the type "RTSP://" of the selected audio/video streaming object, the WAP client generates a set-up command for transmission to a streaming client 60, also located within the mobile terminal 10. The set-up command includes the address/identity of the selected streaming object. The WAP client 25 and the streaming client 60 are interconnected via an interface 65 which may be standardized or proprietary. It should be realized, that the WAP gateway/client 25 may also be used to start clients other than streaming client 60. If the received target address is tagged with, for example, "SIP://", the WAP client 25 could start up a SIP client rather than a streaming client. The SIP client would then use the provided address to establish a SIP session (e.g., an audio/video or just audio conference between two parties).

The streaming client 60, in response to the set-up command received from the WAP client 25, transmits a second set-up command to the radio unit 35 to establish a wireless signaling link 75 between the mobile terminal 10 and the IP based streaming server 50. An interface 70 also interconnects the streaming client 60 with the radio unit 35 which may be standardized or proprietary.

The radio unit 35, responsive to the second set-up command from the streaming client, sets up a wireless signaling link 75 that fulfills the requirements for a streaming capable client 60 to transmit and receive signals with the IP based streaming server 50 within the external IP network 20. The radio unit 35 notifies the streaming client 60 once said connection is established or notifies the streaming client 60 immediately in case a wireless signaling link already exists. Once the wireless signaling link 40 is established between the external IP network 20 and the mobile terminal 10, either one of them may transmit streaming data signaling over the link.

Signals for obtaining an audio/video description and setting up the streaming audio/video criteria are transmitted over the link 40. When said signaling over said wireless signaling link 40 is completed, the streaming client 60 transmits a third

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command to the radio unit 35 to establish a wireless streaming media link on the wireless signaling link 75 between the mobile terminal 10 and the IP streaming server 50. The radio unit 35, responsive to the third set-up command from the streaming client, sets up a streaming medium over link 75 that fulfills the requirements for a streaming capable client 60 to receive streaming audio/video media from the IP based streaming server 50 within the external IP network 20.

The radio unit 35 notifies the streaming client 60 once said wireless streaming media link 75 is established. The streaming client 60 can then submit a "play" signal over said wireless signaling link 75 to streaming server 50. Once the streaming server 50 sends an acknowledgment to streaming client 60, the streaming server 50 will start transmitting audio/video media over said wireless streaming media link 75 to the streaming client 60.

Referring now to FIGURE 2, there is provided a signaling diagram more specifically illustrating the process discussed above with respect to FIGURE 1. Initially, the WAP client 25 selects at 80 an address/identity of each of the selectable streaming objects 30 provided by WAP server 45. The selection 80 is made via the radio unit 35 and WAP server 45. The selected address/identity of each of the selectable streaming objects are transmitted at 85 back to the WAP client 25 wherein the identity is noted (e.g., RTSP://audiovideo.cellularoperatorone.com/jackmichelson/thriller) and forwarded to the streaming client 60 within a set-up command 90. As mentioned previously, the set-up command 90 must contain the address/identity of the selected streaming object 30 within the WAP gateway/server 45. The streaming client 60 transmits a second set-up command 95 to the radio unit 35 to initiate establishment of a signaling radio channel 100 to the IP based streaming server 50 within the external IP network 20. The streaming client 60 is notified at 105 of establishment of the signaling radio channel 100. Once notified at 105 of establishment of the channel 100, the streaming client 60 sends a "describe" signal 108 including the access/identity of the selected streaming object 30 to the streaming server 50. The "describe" signal 108 includes the address to the description of the streaming object 30 in audio/video data base 15. When the streaming client 60 receives a description 110 of the streaming object 30 (e.g., codec

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type) via streaming server 50, the client sends back "set-up" signals 115 indicating, for example, the IP address and port numbers on which the client wishes to receive streaming audio or video data from the streaming server 50, and the streaming server 50 transmits back an acknowledgment signal 120 responsive to the set-up signals.

5 When the streaming client 60 receives the acknowledgment signal 120, it sends a third set-up command 125 to the radio unit 35 to initiate the establishment of a wireless streaming media radio channel 130 to the IP based streaming server 50 within the external IP network 20. The streaming client 60 is notified at 135 by the radio unit 35 of the establishment of the streaming media radio channel 130. The streaming
10 client 60 sends a "play" signal 140 to the streaming server 50, which activates at 145 the selected object 30 in the audio/video database 15. When the streaming client 60 receives the acknowledgment signal 150 from the streaming server 50, the streaming client can then receive the selected streaming object 30 over said streaming media radio channel 130.

15 This process enables all mobile terminals 10 equipped with a WAP streaming client and an IP streaming client or circuit multimedia client to receive realtime streaming audio/video data from a external IP network 20 without utilizing a time consuming "network to mobile terminal" paging process. This process would, of course, normally be implemented in a media rights management call chain, which
20 includes authorization, charging, etc. The authorization and charging related parameters would be fed back to the user when the user clicks on a desired streaming object shown on the WAP Homepage.

 The previous description is of a preferred embodiment for implementing the invention, and the scope of the invention should not necessarily be limited by this
25 description. The scope of the present invention is instead defined by the following claims.

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WHAT IS CLAIMED IS:

1. A method for providing streaming data to a mobile terminal comprising the steps of:
 - selecting a streaming object residing in a database located in a network
5 through a client of the mobile terminal;
 - providing an identifier of the selected streaming object to the client of the mobile terminal; and
 - establishing a connection from the mobile terminal to a server associated with transmission of the streaming data from the database, responsive to the
10 provided identifier.
2. The method of Claim 1, wherein the identifier further comprises an E.164 number.
- 15 3. The method of Claim 1, wherein the identifier further comprises an e-mail address.
4. The method of Claim 1, wherein the identifier further comprises a URL address.
20
5. The method of Claim 1, wherein the step of establishing further comprises the steps of:
 - generating a first set-up command containing the provided identifier for transmission from the client to a streaming client within the mobile terminal
25 responsive to the provided identifier;
 - generating a second set-up command containing the provided identifier for transmission from the streaming client to a radio unit within the mobile terminal responsive to the first set-up command;
 - establishing a second connection between the radio unit and the server
30 responsive to the second set-up command; generating a third set-up command to establish a streaming media radio channel; and

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establishing the streaming media radio channel between the radio unit and the server.

5 6. The method of Claim 5, further comprising the step of transmitting the streaming data over the established radio streaming media radio channel from the database to the mobile terminal.

10 7. The method of Claim 5, further comprising the step of notifying the streaming client of establishment of the radio link with the server.

8. The method of Claim 1, wherein the streaming data comprises audio streaming data.

15 9. The method of Claim 1, wherein the streaming data comprises video streaming data.

10 10. The method of Claim 1, wherein the streaming data comprises 3-D complex graphics data.

20 11. The method of Claim 1, wherein the streaming data comprises measuring data.

 12. A method for providing streaming data at a mobile terminal, comprising the steps of:

25 selecting a streaming object residing in a storage location in a network using a browser in the mobile terminal;

 receiving an identifier for the selected streaming object;

 generating a first set-up command containing the provided identifier for transmission from the client to a streaming client within the mobile terminal responsive to the provided identifier;

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generating a second set-up command containing the provided identifier for transmission from the streaming client to a radio unit within the mobile terminal responsive to the first set-up command;

5 establishing a link between the radio unit and the server responsive to the second set-up command;

generating a third set-up command to establish a streaming media radio channel; and

establishing the streaming media radio channel between the radio unit and the server.

10

13. The method of Claim 12, wherein the identifier further comprises an E.164 number.

14. The method of Claim 12, wherein the identifier further comprises an e-mail address.

15

15. The method of Claim 12, wherein the identifier further comprises a URL address.

16. The method of Claim 12, further comprising the step of notifying the streaming client of the establishment of the radio link with the server.

20

17. The method of Claim 12, wherein the streaming data comprises audio streaming data.

25

18. The method of Claim 12, wherein the streaming data comprises video streaming data.

19. The method of Claim 12, wherein the streaming data comprises 3-D complex graphics data.

30

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20. The method of Claim 12, wherein the streaming data comprises measuring data.

21. A mobile terminal for transmitting streaming data comprising:
5 a browser for selecting a streaming object residing at a storage location within a network, said browser further generating a first set-up command responsive to receipt of an identifier for the selected streaming object;

a streaming client responsive to the first setup command for generating a second set-up command;

10 a radio unit for establishing a communication link with a streaming server responsive to the second set-up command, the radio unit further notifying the streaming client upon establishment of the communications link.

22. The mobile terminal of Claim 21, wherein the first and second set-up
15 commands further include the identifier.

23. The mobile terminal of Claim 21, wherein the identifier comprises an E.164 number.

20 24. The mobile terminal of Claim 21, wherein the identifier comprises an e-mail address.

25 25. The mobile terminal of Claim 21, wherein the identifier comprises a URL address.

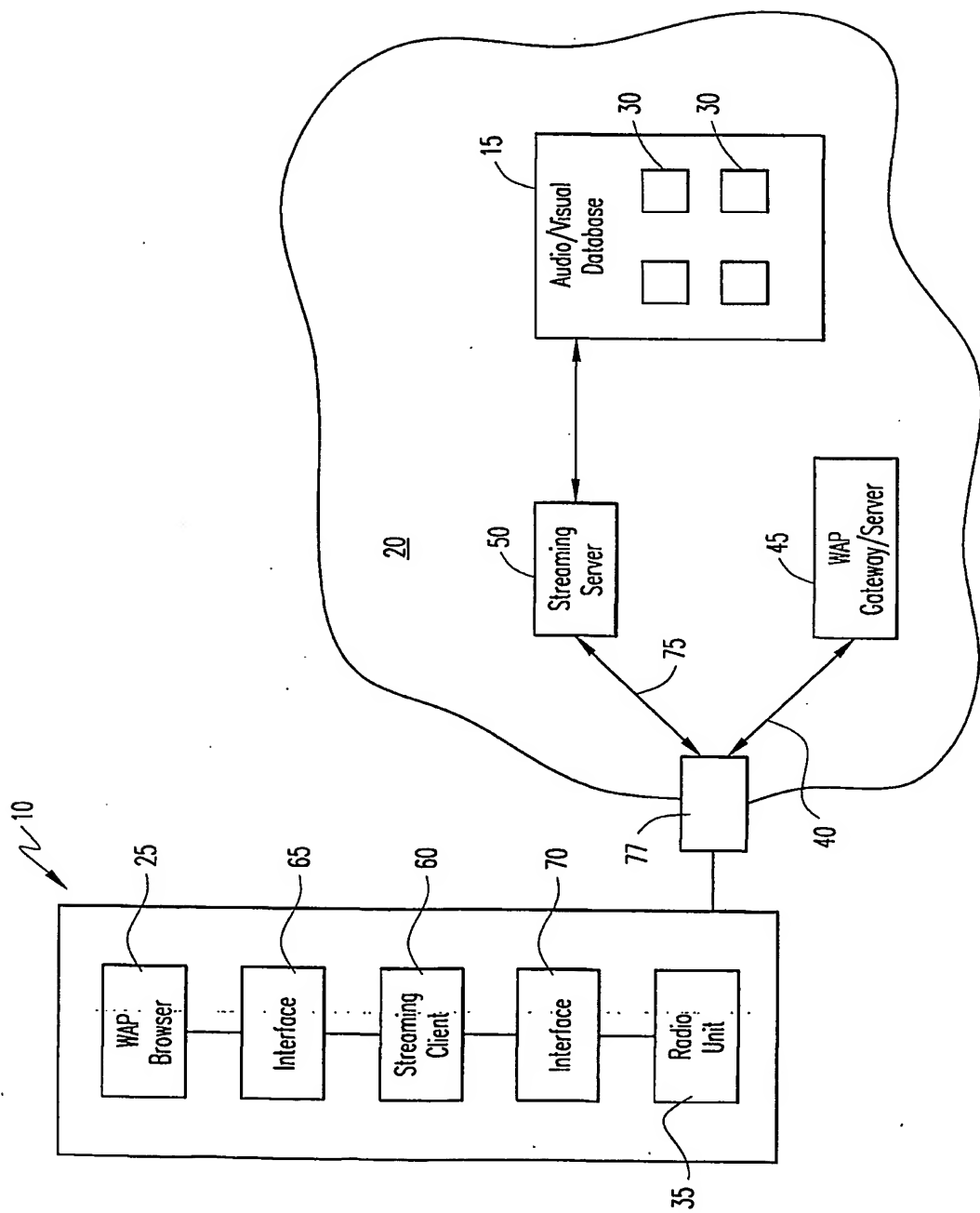


FIG. 1

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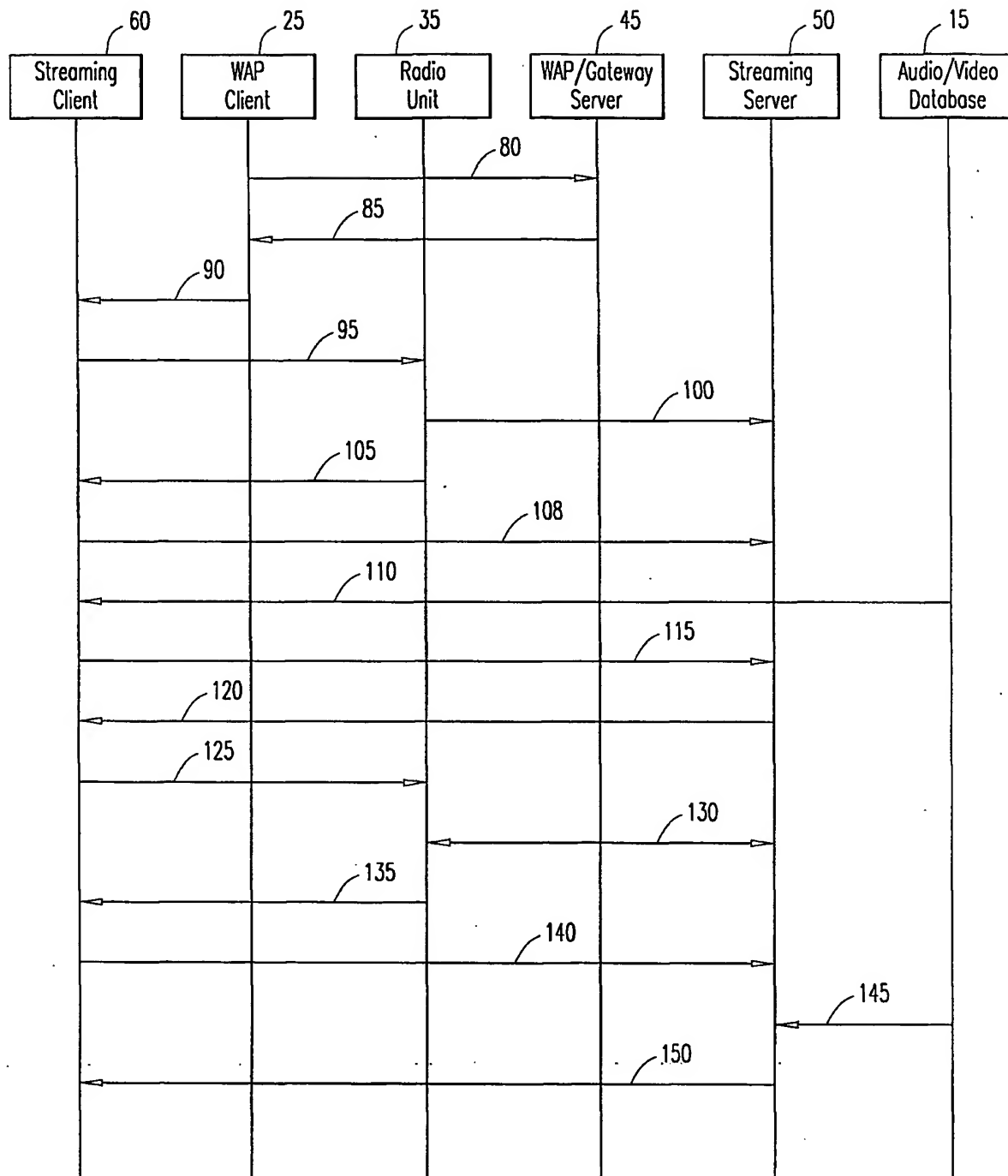


FIG. 2

SUBSTITUTE SHEET (RULE 26)

INTERNATIONAL SEARCH REPORT

Intern I Application No
PCT/SE 01/01591A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04L29/08

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|---|--|
| X | US 6 023 223 A (BAXTER JR JOHN FRANCIS) 8 February 2000 (2000-02-08) the whole document | 1-6, 11-15, 20-25 |
| X | LUIZ M ALVES DOS SANTOS: "MULTIMEDIA DATA AND TOOLS FOR WEB SERVICES OVER WIRELESS PLATFORMS" IEEE PERSONAL COMMUNICATIONS, IEEE COMMUNICATIONS SOCIETY, US, vol. 5, no. 5, 1 October 1998 (1998-10-01), pages 42-46, XP000786615 ISSN: 1070-9916 the whole document | 1, 4, 5, 8-10, 12, 15, 17-19, 21, 25 |

☐ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

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T later document published after the International filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

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INTERNATIONAL SEARCH REPORT

information on patent family members

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| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---------------------|----------------------------|---------------------|
| US 6023223 A | 08-02-2000 | WO 0055823 A1 | 21-09-2000 |